ESI

EnviroSystems, Inc.
P.O. Box 778
Hampton, NH 03843-0778
603-926-3345

March 7, 2012

Mr. Peter Nyberg
United Water
Hull Wastewater Treatment Facility
1111 Nantasket Avenue
Hull, Massachusetts 02045

Dear Mr. Nyberg:

Enclosed, please find a copy of our report presenting the results of a toxicity test completed using an effluent sample collected from the Hull, Massachusetts Wastewater Treatment Facility during the February 2012 sampling period. Acute toxicity was evaluated using the inland silverside, *Menidia beryllina*.

Please do not hesitate to call me, Kirk Cram or Petra Karbe should you have any questions regarding the report.

Sincerely,

EnviroSystems, Incorporated

Kenneth A. Simon
President

Enclosure
WET Test Report Certification
Report Number 21917-12-02
One (1) copy + email

WHOLE EFFLUENT TOXICITY TEST REPORT CERTIFICATION

Permittee Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Executed on: _____

_____

Authorized Signature

_____

Print or Type Name

Hull Permanent Sewer Commision

Print or Type the Permittee's Name

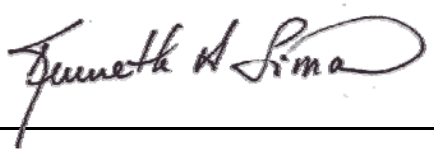
MA0101231

Type or Print the NPDES Permit No.

WHOLE EFFLUENT TOXICITY TEST REPORT CERTIFICATION (Bioassay Laboratory)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Executed on: March 7, 2012



Kenneth A. Simon
President - EnviroSystems, Inc.

TOXICOLOGICAL EVALUATION
OF A TREATED MUNICIPAL EFFLUENT
BIOMONITORING SUPPORT FOR A NPDES PERMIT:
February 2012

Hull Wastewater Treatment Facility
Hull, Massachusetts
NPDES Permit Number MA0101231

Prepared For:

United Water
Hull Wastewater Treatment Facility
1111 Nantasket Avenue
Hull, Massachusetts 02045

Prepared By:

EnviroSystems, Incorporated
One Lafayette Road
Hampton, New Hampshire 03842

February 2012
Reference Number Hull 21917-12-02

STUDY NUMBER 21917

EXECUTIVE SUMMARY

The following summarizes the results of an acute exposure bioassay completed during February 2012 in support of the NPDES biomonitoring requirements of the Hull, Massachusetts Wastewater Treatment Facility, operated by United Water. The 48 hour acute definitive assay was completed using the inland silverside, *Menidia beryllina*.

M. beryllina were 9 days old at the start of the test. Dilution water was receiving water collected from Massachusetts Bay at a point away from the discharge.

Samples were received under chain of custody in good order. All sample receipt, test conditions and control endpoints were within protocol specifications except where otherwise noted. The results presented in this report relate only to the samples described on the chain(s) of custody and sample receipt log(s).

Results from the acute exposure assay and their relationship to permit limits are summarized in the following matrix.

Acute Toxicity Evaluation

Species	Exposure	LC-50	A-NOEC	Permit Limit (LC-50)	Effluent Meets Permit Limit	Assay Meets Protocol Limits
Menidia beryllina	48 Hours	>100%	100%	≥100%	Yes	Yes

.

TOXICOLOGICAL EVALUATION
OF A TREATED MUNICIPAL EFFLUENT
BIOMONITORING SUPPORT FOR A NPDES PERMIT:
February 2012

Hull Wastewater Treatment Facility
Hull, Massachusetts
NPDES Permit Number MA0101231

1.0 INTRODUCTION

This report presents the results of an acute toxicity test completed on a composite effluent sample collected from the Hull, Massachusetts Wastewater Treatment Facility (Hull WWTF), operated by United Water. Testing was based on programs and protocols developed by the US EPA (2002) and involved conducting a 48 hour static acute toxicity test with the inland silverside, *Menidia beryllina*. Testing was performed at EnviroSystems, Incorporated (ESI), Hampton, New Hampshire in accordance with the provisions of the NELAC Standards (2003).

Acute toxicity tests involve preparing a series of concentrations by diluting effluent with control water. Groups of test animals are exposed to each effluent concentration and a control for a specified period. In acute tests, mortality data for each concentration are used to calculate (by regression) the median lethal concentration, or LC-50, defined as the effluent concentration which kills half of the test animals. Samples with high LC-50 values are less likely to cause significant environmental impacts. The no-effect concentration is also determined to provide information about the level of effluent which would have minimal acute effects in the environment. This Acute No Observed Effect Concentration (A-NOEC) is defined as the highest tested effluent concentration which causes no significant mortality.

2.0 MATERIALS AND METHODS

2.1 General Methods

Toxicological and analytical protocols used in this program follow procedures primarily designed by the EPA to provide standard approaches for the evaluation of toxicological effects of discharges on aquatic organisms, and for the analysis of water samples. See Section 4.0 for a list of references.

2.2 Test Species

When necessary, *M. beryllina* were acclimated to approximate test conditions prior to use in the assay. Test organisms were transferred to test chambers using a large bore glass pipet, minimizing the amount of water added to test solutions. Twenty control fish were weighed during the test to confirm loading rates. The loading rate was below the maximum 0.4 g/L loading rate recommended for assays conducted at 25°C. Fish weights and loading calculations are included in the data appendix.

2.3 Effluent, Receiving Water and Laboratory Water

Effluent and receiving water collection information is provided in Table 1. Samples were stored at 4°C and warmed to 25±1°C prior to preparing test solutions. Effluent used in the *M. beryllina* assay was salinity adjusted to 25±2 ppt using artificial sea salts according to protocol (EPA 2002). Laboratory water was collected from the Hampton/Seabrook Estuary. This water is classified as SA-1 and has been used to culture marine test organisms since 1981.

Total residual chlorine (TRC) was measured by amperometric titration (MDL 0.02 mg/L) in both the effluent and diluent samples. If chlorine was present in the sample, the sample was dechlorinated using sodium thiosulfate and a control assay using laboratory water treated with an equal amount of sodium thiosulfate was run concurrently. Data for the sodium thiosulfate laboratory control can be found in Appendix

A.

2.4 Acute Toxicity Test

The 48 hour static acute toxicity test was conducted at 25±1°C with a photoperiod of 16:8 hours light:dark. Test chambers were 250 mL glass beakers containing 200 mL test solution in each of 4 replicates with 10 organisms/replicate. Test concentrations for the assay were 100%, 50%, 25%, 12.5%, and 6.25% effluent. Survival and dissolved oxygen were recorded daily in all replicates. Specific conductivity, salinity, temperature, and pH were measured daily in one replicate of each test treatment.

2.5 Data Analysis

When applicable, statistical analysis of acute exposure data was completed using CETIS, Comprehensive Environmental Toxicity Testing System, software. The program computes acute exposure endpoints based on EPA decision tree guidelines specified in individual test methods. If survival in the highest test concentration is >50%, the LC-50 is obtained by direct observation of the raw data.

2.6 Quality Control

As part of the laboratory quality control program, standard reference toxicant assays are completed on a regular basis for each test species. These results provide relative health and response data while allowing for comparison with historic data sets. See Table 2 for details.

3.0 RESULTS AND DISCUSSION

Results of the acute exposure bioassay completed using the inland silverside are summarized in Table 3. Effluent and dilution water characteristics are presented in Table 4. US EPA Region I toxicity test summary sheet can be found after the tables. Support data, including copies of the laboratory bench sheets, are included in Appendix A.

Minimum test acceptability criteria require ≥90% survival in the control concentrations. Achievement of these results indicate that healthy test organisms were used and that the dilution water had no significant adverse impact on the outcome of the assay. See the Executive Summary and Table 3 for test acceptability.

4.0 LITERATURE CITED

APHA. 1998. *Standard Methods for the Examination of Water and Wastewater*, 20th Edition. Washington D.C.

National Environmental Laboratory Accreditation Conference: Quality Systems. Chapter 5. June 2003.

US EPA. 2002. *Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms*. Fifth Edition. EPA-821-R-02-012.

US EPA. 2008. *Attachment G: NPDES Whole Effluent Toxicity Testing, Monitoring and Reporting Tips and Common Pitfalls.* US EPA Region I Offices, Boston, Massachusetts.

TABLE 1. Summary of Sample Collection Information.
Hull WWTF Effluent Biomonitoring Program. February 2012.

Sample Description	Type	Collection Date	Collection Time	Receipt Date	Receipt Time	Arrival Temp °C
Effluent	Comp	02/14-15/12	0800-0800	02/15/12	0830	4
Receiving Water	Grab	02/15/12	0815	02/15/12	0830	4

TABLE 2. Summary of Reference Toxicant Data.
Hull WWTF Effluent Biomonitoring Program. February 2012.

Date		Endpoint	Value	Historic Mean/ Central Tendency	Acceptable Range	Reference Toxicant
M. beryllina						
01/31/12	Survival	LC-50 - 48 Hr	8.2	7.5	4.8 - 10.3	SDS (mg/L)

Means and Acceptable Ranges based on the most recent 20 reference toxicant assays

TABLE 3. Summary of Acute Evaluation Results.
Hull WWTF Effluent Biomonitoring Program. February 2012.

Percent Survival

Species	Exposure	Lab	RW	6.25%	12.5%	25%	50%	100%
M. beryllina	48 hours	100%	100%	100%	100%	100%	100%	100%

LC-50 and A-NOEC Results

Species	Exposure	Spearman-Karber	Probit	A-NOEC
M. beryllina	48 Hours	NC	NC	100%

COMMENTS:
RW - Receiving Water; used as diluent for assay
NC - The LC-50 value could not be computed by this method for this data set.

TABLE 4. Summary of Effluent and Diluent Characteristics.
Hull WWTF Effluent Biomonitoring Program. February 2012.

PARAMETER	UNIT	EFFLUENT	RECEIVING WATER
Specific Conductivity - As Received	µmhos/cm	1354	47400
Specific Conductivity - Salinity Adjusted	µmhos/cm	38680	39380
pH - As Received	SU	7.12	7.97
pH - Salinity Adjusted	SU	7.77	8.04
Salinity - As Received	ppt	8	31
Salinity - Salinity Adjusted	ppt	25	25
Total Residual Chlorine	mg/L	0.343	<0.02
Total Solids	mg/L	9000	36000
Total Suspended Solids	mg/L	8.4	9
Ammonia as N	mg/L	4	<0.1
Total Organic Carbon	mg/L	6.5	<0.4
Aluminum, total	mg/L	0.022	0.027
Cadmium, total	mg/L	<0.0005	<0.0007
Chromium, total	mg/L	<0.002	<0.002
Copper, total	mg/L	0.017	<0.002
Lead, total	mg/L	<0.0005	<0.0005
Nickel, total	mg/L	<0.002	<0.002
Zinc, total	mg/L	0.048	<0.002

COMMENTS:

Additional water quality and analytical support chemistry data are available in Appendix A.

TOXICITY TEST SUMMARY SHEET

FACILITY NAME: Hull WWTF
NPDES PERMIT NO.: MA0101231
TEST START DATE: 02/15/12
TEST END DATE: 02/17/12

TEST TYPE	TEST SPECIES	SAMPLE TYPE	SAMPLE METHOD
X Acute	___ *Pimephales promelas*	___ Prechlorinated	___ Grab
___ Chronic	___ *Ceriodaphnia dubia*	___ Dechlorinated	X Composite
___ Modified Chronic (Reporting Acute Values)	___ *Daphnia pulex*	___ Chlorine Spiked in Lab	___ Flow-thru
	___ *Americamysis bahia*	___ Chlorinated on Site	___ Other
___ 24 Hour Screen	___ *Cyprinodon variegatus*	___ Unchlorinated	
	X *Menidia beryllina*	___ No Detectable Chlorine Upon Receipt	
	___ *Arbacia punctulata*	X Dechlorinated at lab	
	___ *Champia parvula*		
	___ *Selenastrum capricornutum*		

DILUTION WATER:

X Receiving water collected at a point upstream or away from the discharge, free from toxicity or other sources of contamination; Receiving Water Name: Massachusetts Bay

___ Alternate surface water of known quality and hardness, to generally reflect the characteristics of the receiving water; Receiving Water Name: _____

___ Synthetic water prepared using either Millipore Milli-Q or equivalent deionized water and reagent grade chemicals; or deionized water combined with mineral water.

___ Artificial sea salts mixed with deionized water

___ Deionized water and hypersaline brine

___ Other

EFFLUENT SAMPLING DATES: 02/14-15/12 _____ _____ _____

EFFLUENT CONCENTRATIONS TESTED (%): 6.25; 12.5; 25.0; 50.0; 100

Permit Limit Concentration: ≥100 %

Was the effluent salinity adjusted? Yes If yes, to what level? 25 ppt

REFERENCE TOXICANT TEST DATE: 01/31/12 LC-50: 8.2 mg/L Sodium Dodecyl Sulfate

PERMIT LIMITS AND TEST RESULTS

Test Acceptability Criteria

Mean Control Survival: 100%

LIMITS		**RESULTS**	
LC-50:	≥100 %	LC-50	>100 %
		Upper Limit:	- %
A-NOEC:	- %	Lower Limit:	- %
		Method:	Direct Observation
C-NOEC:	- %	A-NOEC:	100 %
		C-NOEC:	- %
		LOEC:	-
IC- ___	- %	IC- ___	- %

APPENDIX A

DATA SHEETS

STATISTICAL SUPPORT

METHODS USED IN NPDES PERMIT BIOMONITORING TESTING

Parameter	Method
Acute Exposure Bioassays:	
Ceriodaphnia dubia	EPA-821-R-02-012 2002.0
Daphnia pulex	EPA-821-R-02-012 2021.0
Pimephales promelas	EPA-821-R-02-012 2000.0
Americamysis bahia	EPA-821-R-02-012 2007.0
Menidia beryllina	EPA-821-R-02-012 2006.0
Cyprinodon variegatus	EPA-821-R-02-012 2004.0
Chronic Exposure Bioassays:	
Ceriodaphnia dubia	EPA-821-R-02-013 1002.0
Pimephales promelas	EPA-821-R-02-013 1000.0
Cyprinodon variegatus	EPA-821-R-02-014 1004.0
Menidia beryllina	EPA-821-R-02-014 1006.0
Arbacia punctulata	EPA-821-R-02-014 1008.0
Champia parvula	EPA-821-R-02-014 1009.0
Trace Metals:	
Trace Metals	EPA 200.7/SW 6010 and EPA 200.8/SW 6020
Hardness	Standard Methods 20th Edition - Method 2340 B
Wet Chemistries:	
Alkalinity	EPA 310.2
Chlorine, Residual	Standard Methods 20th Edition - Method 4500CLD
Total Organic Carbon	Standard Methods 20th Edition - Method 5310C
Specific Conductance	Standard Methods 20th Edition - Method 2510B
Nitrogen - Ammonia	Standard Methods 20th Edition - Method 4500NH3G
pH	Standard Methods 20th Edition - Method 4500H+B
Solids, Total (TS)	Standard Methods 20th Edition - Method 2540 B
Solids, Total Dissolved (TDS)	Standard Methods 20th Edition - Method 2540 C
Solids, Total Suspended (TSS)	Standard Methods 20th Edition - Method 2540 D
Dissolved Oxygen	Standard Methods 20th Edition - Method 4500-O G

Please visit our web site at www.envirosystems.com for a copy of our NH NELAP Accreditation and Massachusetts State Certification.

ACUTE BIOASSAY DATA SUMMARY

STUDY: 21917

CLIENT: United Water

TEST ORGANISM: *M. beryllina*

SAMPLE: Hull WWTF Effluent

ORGANISM SUPPLIER/ BATCH / AGE: *See Organism Culture Sheet*

DILUENT: Receiving Water

"AS RECEIVED" EFFLUENT AND DILUENT CHEMISTRIES

	TRC	TS/S	AMM	TOC	METALS	SAL	pH	S/C
EFF	0.343 / 20.02	005	004	003	002	7.8	7.12	1354
DIL	20.02	010	009	008	007	30.8	7.97	47400

SALINITY ADJUSTMENT RECORD : 36000 **ML EFFLUENT +** 71 **G SEA SALTS =** **100% ACTUAL PERCENTAGE**

4000 mL RW + 1000 mL DI H_2O = 80%

CONC	REP	SURVIVAL 0	SURVIVAL 24	SURVIVAL 48	DO (mg/L) 0	DO (mg/L) 24	DO (mg/L) 48	pH (SU) 0	pH (SU) 24	pH (SU) 48	TEMP (°C) 0	TEMP (°C) 24	TEMP (°C) 48	S/C (µmhos/cm) 0	S/C (µmhos/cm) 24	S/C (µmhos/cm) 48	SALINITY (ppt) 0	SALINITY (ppt) 24	SALINITY (ppt) 48
LAB	A	10	10	10	8.4	4.5	4.4	8.15	7.53	7.53	24	24	24	38390	38110	39180	24	24	25
	B	10	10	10	8.4	4.6	4.5												
	C	10	10	10	8.4	4.6	4.3												
	D	10	10	10	8.4	4.5	4.4												
Rec' Water	A	10	10	10	10.2	4.9	4.4	8.04	7.59	7.59	24	24	24	39380	40480	41470	25	26	27
	B	10	10	10	10.2	5.2	4.5												
	C	10	10	10	10.2	5.0	4.5												
	D	10	10	10	10.2	5.1	4.5												
6.25%	A	10	10	10	9.4	5.2	4.5	8.03	7.64	7.61	24	24	24	39400	40440	41450	25	26	27
	B	10	10	10	9.4	5.2	4.5												
	C	10	10	10	9.4	5.1	4.5												
	D	10	10	10	9.4	4.9	4.5												
12.5%	A	10	10	10	9.3	5.2	4.5	8.02	7.69	7.62	24	24	24	39660	40830	41860	25	26	27
	B	10	10	10	9.3	5.2	4.4												
	C	10	10	10	9.3	5.2	4.5												
	D	10	10	10	9.3	5.1	4.5												
DATE		2/15/12	2/16	2/17/12	2/15/12	2/16	2/17												
TIME		1515	1330	1525	1500	1310	1455												
INITIALS		LB	CS		CS	CS	CS												

ACUTE BIOASSAY DATA SUMMARY

STUDY: 21917

CLIENT: United Water

TEST ORGANISM: *M. beryllina*

SAMPLE: Hull, MA WWTF

DILUENT: Receiving Water

"AS RECEIVED" EFFLUENT AND DILUENT CHEMISTRIES

	TRC	TS/S	AMM	TOC	ALK	HARD	SAL
EFF			See	Page	1		
DIL							

CONC	REP	SURVIVAL 0	SURVIVAL 24	SURVIVAL 48	DO (mg/L) 0	DO (mg/L) 24	DO (mg/L) 48	pH (SU) 0	pH (SU) 24	pH (SU) 48	TEMP (°C) 0	TEMP (°C) 24	TEMP (°C) 48	S/C (µmhos/cm) 0	S/C (µmhos/cm) 24	S/C (µmhos/cm) 48	SALINITY (ppt) 0	SALINITY (ppt) 24	SALINITY (ppt) 48
25%	A	10	10	10	9.3	5.1	4.6	7.98	7.70	7.68	24	24	24	39460	40830	42140	25	26	27
	B	10	10	10	9.3	5.2	4.6												
	C	10	10	10	9.3	5.2	4.7												
	D	10	10	10	9.3	5.1	4.6												
50%	A	10	10	10	9.1	4.8	4.5	7.91	7.69	7.68	24	24	24	39240	40000	41470	25	26	27
	B	10	10	10	9.1	5.0	4.6												
	C	10	10	10	9.1	5.1	4.6												
	D	10	10	10	9.1	4.7	4.6												
100%	A	10	10	10	9.0	4.6	4.5	7.77	7.71	7.74	24	24	24	38680	39240	40990	25	26	26
	B	10	10	10	9.0	4.6	4.4												
	C	10	10	10	9.0	4.6	4.3												
	D	10	10	10	9.0	4.7	4.2												
DATE		2/15/12	2/16	2/17/12	2/15/12	2/16	2/17												
TIME		1515	1330	1525	500	1310	1455												
INITIALS		VB	CS		CC	CS	CS												

Sodium Thiosulfate Lab Control

M. beryllina ACUTE BIOASSAY DATA SUMMARY

STUDY: 21917	TEST ORGANISM: *M. beryllina*
CLIENT: HUII	
SAMPLE: EO,DO	
DILUENT: LAB SALT	

Solution ID#: C-6003

CONC	REP	SURVIVAL			DISSOLVED OXYGEN			pH (SU)			TEMP (°C)			SALINITY (ppt)		
		0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
Lab	A	10	10	10	8.3	4.7	4.4	8.01	7.60	7.63	24	24	24	25	26	26
	B	10	10	10	8.3	4.8	4.4									
	C	10	10	10	8.3	4.8	4.3									
	D	10	10	10	8.3	4.9	4.4									

Organism Wet Weights

Study: 21917

Client: Hull

Date/Time/Intials: 02/15/12 1545 LB

Start/End?: Start

Rep	Weight (g)
1	0.00494
2	0.00909
3	0.00468
4	0.00568
5	0.00355
6	0.00616
7	0.00867
8	0.00288
9	0.00228
10	0.00307
11	0.00547
12	0.00256
13	0.00145
14	0.00497
15	0.00401
16	0.00541
17	0.00409
18	0.00262
19	0.00253
20	0.00086

Mean Weight (g):	0.0042485
Test Volume (L):	0.2
Loading Rate(g/L):	0.212425

Rec'd. 2/15/12

Aquatic Research Organisms

DATA SHEET

I. Organism History

Species Menidia beryllina

Source: Lab reared ✓ Hatchery reared _____ Field collected _____

Hatch date 2-6-12 Receipt date _____

Lot number 020312MB Strain _____

Brood origination Cape Cod MA

II. Water Quality

Temperature 25 °C Salinity ~27 ppt D.O. — ppm

pH 7.8 su Hardness — ppm Alkalinity — ppm

III. Culture Conditions

Freshwater _____ Saltwater ✓ Other _____

Recirculating ✓ Flow through _____ Static renewal _____

DIET: Flake food ✓ Phytoplankton _____ Trout chow _____

Artemia ✓ Rotifers ✓ YCT _____ Other Encap. Shrimp Diet

Prophylactic treatments: _____

Comments: _____

_____

IV. Shipping Information

Client: ESI # of Organisms 3204+

Carrier: _____ Date shipped 2-15-12

Biologist: Mark Rowe

PO BOX 1271 HAMPTON NH 03843-1271 (603) 926-1650 AROFISH@AOL.COM
WWW.AROFISH.US

RECORD OF METERS USED

STUDY: 21917	CLIENT: United Water - Hull, MA WWTF		
Exposure (Hours)			
	0	24	48
Water Quality Station #	1	2*	2
Initials / Date	2/15/12 CS	2/16 CS	2/17 CS

Water Quality Station #1		Water Quality Station #2		COMMENTS
DO meter #	24	DO meter #	23 / 24*	
DO probe #	90	DO probe #	91 / 190*	
pH meter #	1097	pH meter #	470	
pH probe #	103	pH probe #	104	
S/C meter #	YSI 30E	S/C meter #	YSI 30E	
S/C probe #	↓	S/C probe #	↓	
Salinity meter #	↓	Salinity meter #	↓	

PREPARATION OF DILUTIONS

Diluent: Receiving Water (RW)	Day: 0 Sample: E0, DO	
Concentration %	Vol. Eff.(mls)	Final Vol.(mls)
Lab	0	800
RW	0	↓
6.25%	50	↓
12.5%	100	↓
25%	200	↓
50%	400	↓
100%	800	↓
INITIALS:	SJ	
TIME:	1450	
DATE:	2/15/12	

Report No: 21917 SDG:
Project: Hull

Sample ID: Effluent Start
Matrix: Water
Sampled: 02/15/12 0800

Parameter		Result		Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total solids	21917-005	9000		50	mg/L	02/15/12 0730	02/16/12 0930	JTP/SM2540B
Total suspended solids	21917-005	8.4		2.5	mg/L	02/16/12 1120	02/21/12 1325	JTP/SM 2540D
Total organic carbon	21917-003	6.5		0.4	mg/L	02/17/12	02/17/12	MES/SM 5310 C
Ammonia-N	21917-004	4		0.1	mg/L as N	02/21/12 1226	02/21/12 1226	JLH/SM 4500-NH3 G
Aluminum, total	21917-002	0.022		0.02	mg/L	02/28/12 1215	03/02/12	JLH/EPA 200.8
Cadmium, total	21917-002	ND		0.0005	mg/L	02/28/12 1215	03/02/12	JLH/EPA 200.8
Calcium, total	21917-002	110		0.1	mg/L	02/28/12 1215	03/02/12	JLH/EPA 200.8
Chromium, total	21917-002	ND		0.002	mg/L	02/28/12 1215	03/02/12	JLH/EPA 200.8
Copper, total	21917-002	0.017		0.002	mg/L	02/28/12 1215	03/02/12	JLH/EPA 200.8
Lead, total	21917-002	ND		0.0005	mg/L	02/28/12 1215	03/02/12	JLH/EPA 200.8
Magnesium, total	21917-002	240		0.05	mg/L	02/28/12 1215	03/02/12	JLH/EPA 200.8
Nickel, total	21917-002	ND		0.002	mg/L	02/28/12 1215	03/02/12	JLH/EPA 200.8
Zinc, total	21917-002	0.048		0.002	mg/L	02/28/12 1215	03/02/12	JLH/EPA 200.8

Sample ID: Receiving Water Start
Matrix: Water
Sampled: 02/15/12 0815

Parameter		Result		Quant Limit	Units	Date Prepared	Date of Analysis	INIT/Method/Reference
Total solids	21917-010	36000		50	mg/L	02/15/12 0730	02/16/12 0930	JTP/SM2540B
Total suspended solids	21917-010	9		2.5	mg/L	02/16/12 1120	02/21/12 1325	JTP/SM 2540D
Total organic carbon	21917-008	ND		0.4	mg/L	02/17/12	02/17/12	MES/SM 5310 C
Ammonia-N	21917-009	ND		0.1	mg/L as N	02/21/12 1227	02/21/12 1227	JLH/SM 4500-NH3 G
Aluminum, total	21917-007	0.027		0.02	mg/L	02/28/12 1215	03/02/12	JLH/EPA 200.8
Cadmium, total	21917-007	ND		0.0007	mg/L	02/28/12 1215	03/02/12	JLH/EPA 200.8
Calcium, total	21917-007	360		0.3	mg/L	02/28/12 1215	03/02/12	JLH/EPA 200.8
Chromium, total	21917-007	ND		0.002	mg/L	02/28/12 1215	03/02/12	JLH/EPA 200.8
Copper, total	21917-007	ND	J5	0.002	mg/L	02/28/12 1215	03/02/12	JLH/EPA 200.8
Lead, total	21917-007	ND		0.0005	mg/L	02/28/12 1215	03/02/12	JLH/EPA 200.8
Magnesium, total	21917-007	990		0.07	mg/L	02/28/12 1215	03/02/12	JLH/EPA 200.8
Nickel, total	21917-007	ND	J5	0.002	mg/L	02/28/12 1215	03/02/12	JLH/EPA 200.8
Zinc, total	21917-007	ND	J5	0.002	mg/L	02/28/12 1215	03/02/12	JLH/EPA 200.8

Notes:

ND = Not Detected
J5 = Estimate. MS %R below limit due to high salt content of sample.

ESI

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	21917		
SDG No:	Hull		
Project:	Hull		
Delivered via:	ESI		
Date and Time Received:	02/15/12 0830	Date and TIme Logged into Lab:	02/15/12 1430
Recieved By:	BS	Logged into Lab by:	SJ
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	Yes	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	4	Custody Seals intact?	NA
Number of COC Pages:	1		
COC Serial Number(s):	A1007850		
COC Complete:		Does the info on the COC match the samples?	Yes
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required		

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
Effluent Start	21917-001	W	MB48AD StartSample	1x3750 P	4 C	Yes
Effluent Start	21917-002	W	Total Metals Cd,Cr,Ni,Pb,Cu,Zn,Al,Ca,Mg;	250 P	HNO3	Yes
Effluent Start	21917-003	W	TOC	1x40 G	H2SO4	Yes
Effluent Start	21917-004	W	NH3;	125 P	H2SO4	Yes
Effluent Start	21917-005	W	TS,TSS	500 P	4 C	Yes
Receiving Water Start	21917-006	W	MB48AD StartDiluent	2x3750 P	4 C	Yes
Receiving Water Start	21917-007	W	Total Metals Cd,Cr,Ni,Pb,Cu,Zn,Al,Ca,Mg;	250 P	HNO3	Yes
Receiving Water Start	21917-008	W	TOC	1x40 G	H2SO4	Yes
Receiving Water Start	21917-009	W	NH3;	125 P	H2SO4	Yes
Receiving Water Start	21917-010	W	TS,TSS	500 P	4 C	Yes

Notes and qualifications:

ESI

EnviroSystems, Inc.
1 Lafayette Road
Hampton, NH 03842

Voice: 603-926-3345
FAX: 603-926-3521

ESI Job No: 21917

CHAIN OF CUSTODY DOCUMENTATION

Client:	United Water - Hull	Contact: Peter Nyberg		Project Name: United Water - Hull WWTF	
Report to:	Peter Nyberg	Address: 1111 Nantasket Avenue		Project Number: P0036	Task: 0001
Invoice to:	Peter Nyberg	Address: Hull, MA 02045		Project Manager: Peter Nyberg	
Voice:	781-925-0906	Fax: 781-925-3056		email: peter.nyberg@unitedwater.com	P.O.No: ' Quote No:41181

Protocol: NPDES

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or com-posite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preser-vation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
	Date Sampled											
001	Effluent Start	2/14-15/12	2/15/12	8AM/8AM	C	1	3750	P	4 C	Water	N	MB48AD StartSample
002	Effluent Start	2/14-15/12	2/15/12	8AM/8AM	C	1	250	P	HNO3	Water	N	Total Metals Cd,Cr,Ni,Pb,Cu,Zn,Al,Ca,Mg;
003	Effluent Start	2/14-15/12	2/15/12	8AM/8AM	C	1	40	G	H2SO4	Water	N	TOC
004	Effluent Start	2/14-15/12	2/15/12	8AM/8AM	C	1	125	P	H2SO4	Water	N	NH3;
005	Effluent Start	2/14-15/12	2/15/12	8AM/8AM	C	1	500	P	4 C	Water	N	TS,TSS
006	Receiving Water Start	2/15/12	2/16/12	8:15AM	G	2	3750	P	4 C	Water	N	MB48AD StartDiluent
007	Receiving Water Start	2/15/12	2/16/12	8:15AM	G	1	250	P	HNO3	Water	N	Total Metals Cd,Cr,Ni,Pb,Cu,Zn,Al,Ca,Mg;
008	Receiving Water Start	2/15/12	2/16/12	8:15AM	G	1	40	G	H2SO4	Water	N	TOC
009	Receiving Water Start	2/15/12	2/16/12	8:15AM	G	1	125	P	H2SO4	Water	N	NH3;
010	Receiving Water Start	2/15/12	2/16/12	8:15AM	G	1	500	P	4 C	Water	N	TS,TSS

Relinquished By:	Date: 2/15/12 Time: 8:30AM	Received By:	Date: 2/15/12 Time: 830
Relinquished By:	Date: Time:	Received at Lab By:	Date: Time:

Comments:

ERR

COC Number: A1007850

Sample Delivery Group No: Feb 2012	Page of